

NEW PATHWAYS: **HISTORIC PRESERVATION & SUSTAINABILITY**

BARBARA A. CAMPAGNA, AIA, LEED AP
Graham Gund Architect of the National Trust

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®



President Lincoln's Cottage



THE NATIONAL TRUST FOR HISTORIC PRESERVATION

The National Trust provides leadership, education, advocacy and resources to save America's diverse historic places and revitalize our communities.



Mississippi River, Milwaukee

PROGRAMS

The Programs department supports local preservationists in saving and enhancing historic resources.



PUBLIC POLICY

Advocates the integration of preservation into public policies before federal, state, and local legislative bodies and appointed officials and pursues annual federal appropriations for state historic preservation and other programs.



French Quarter, New Orleans

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

COMMUNITY REVITALIZATION

Assists states and communities in the revitalization of business districts within a preservation context. The Main Street Program is one of the most well known programs of the Trust.



Hotel de Paris, George, Colorado

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

STEWARDSHIP OF HISTORIC SITES
29 Historic Sites Across the Country that
tell the many-layered story of America.

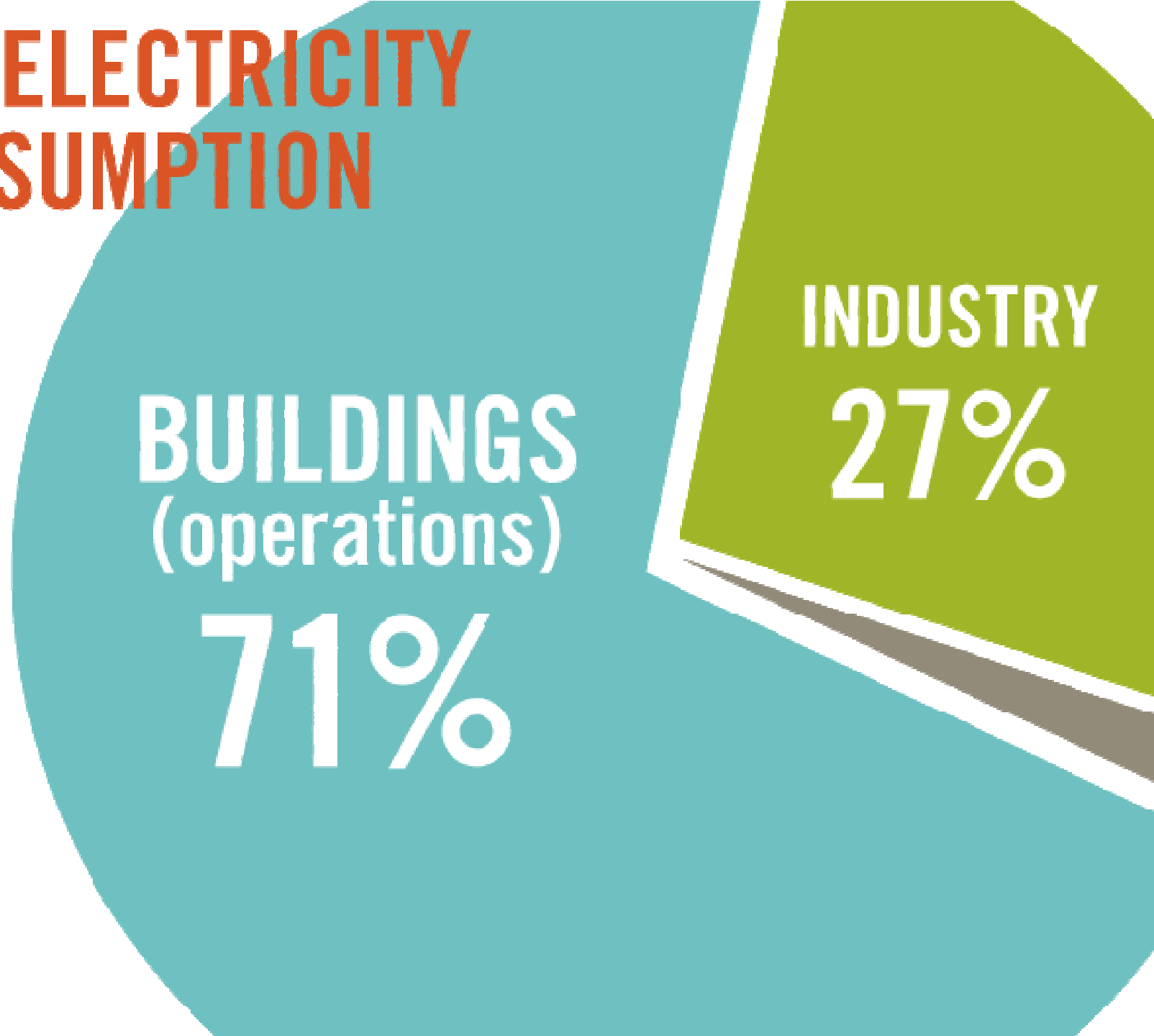


Smog in the Hollywood Hills

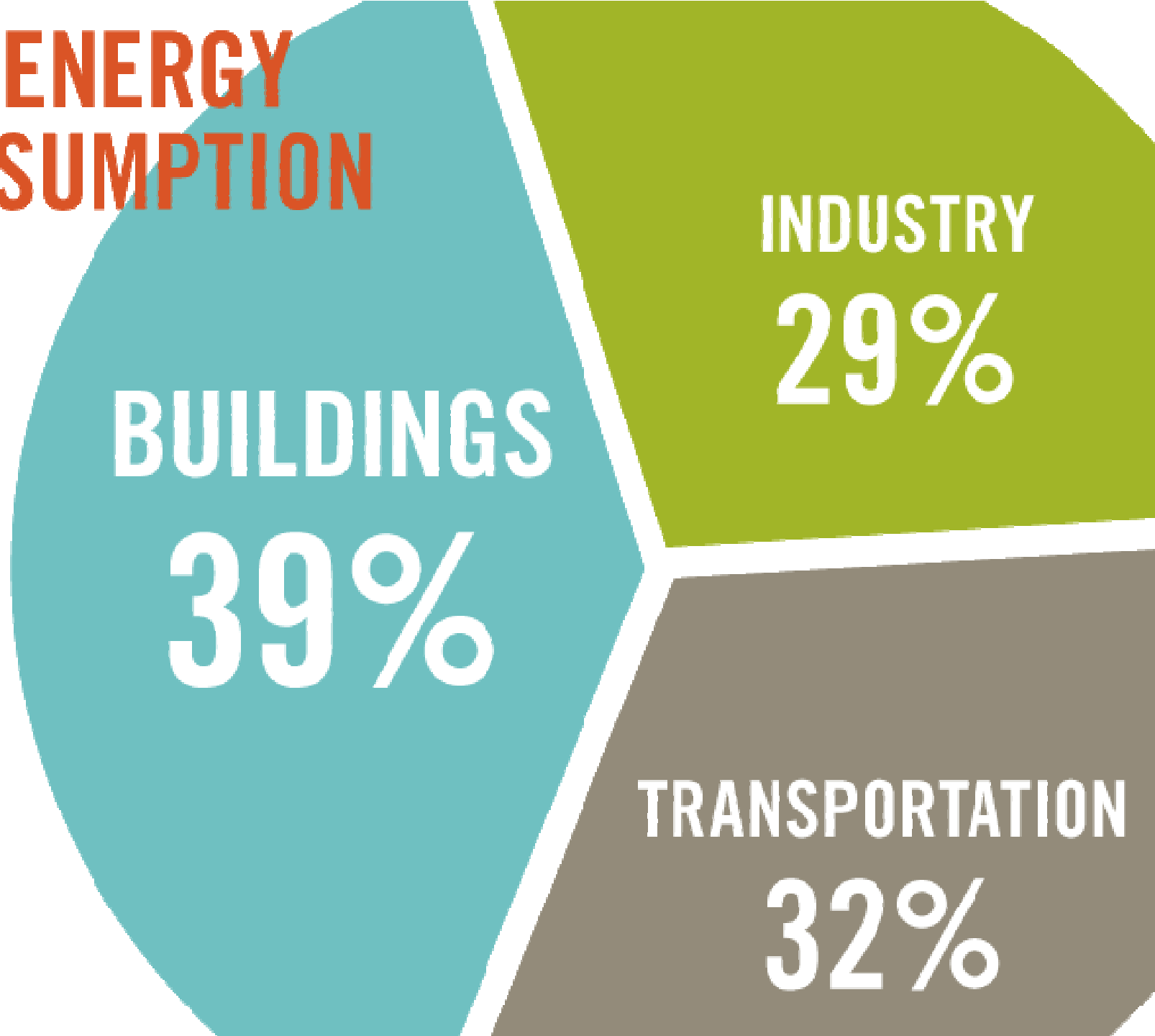
THE SUSTAINABILITY INITIATIVE

**BUILDINGS ACCOUNT FOR 48% OF
GREENHOUSE GAS EMISSIONS IN THE
UNITED STATES**

U.S. ELECTRICITY CONSUMPTION



U.S. ENERGY CONSUMPTION



BUILDINGS
39%

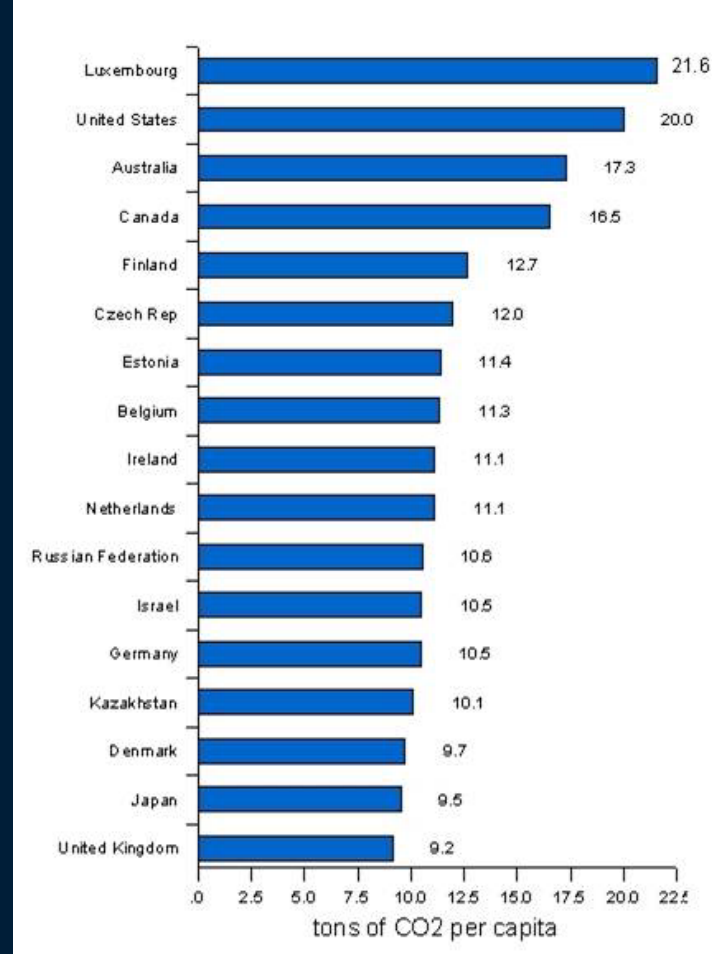
INDUSTRY
29%

TRANSPORTATION
32%

“Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs.”

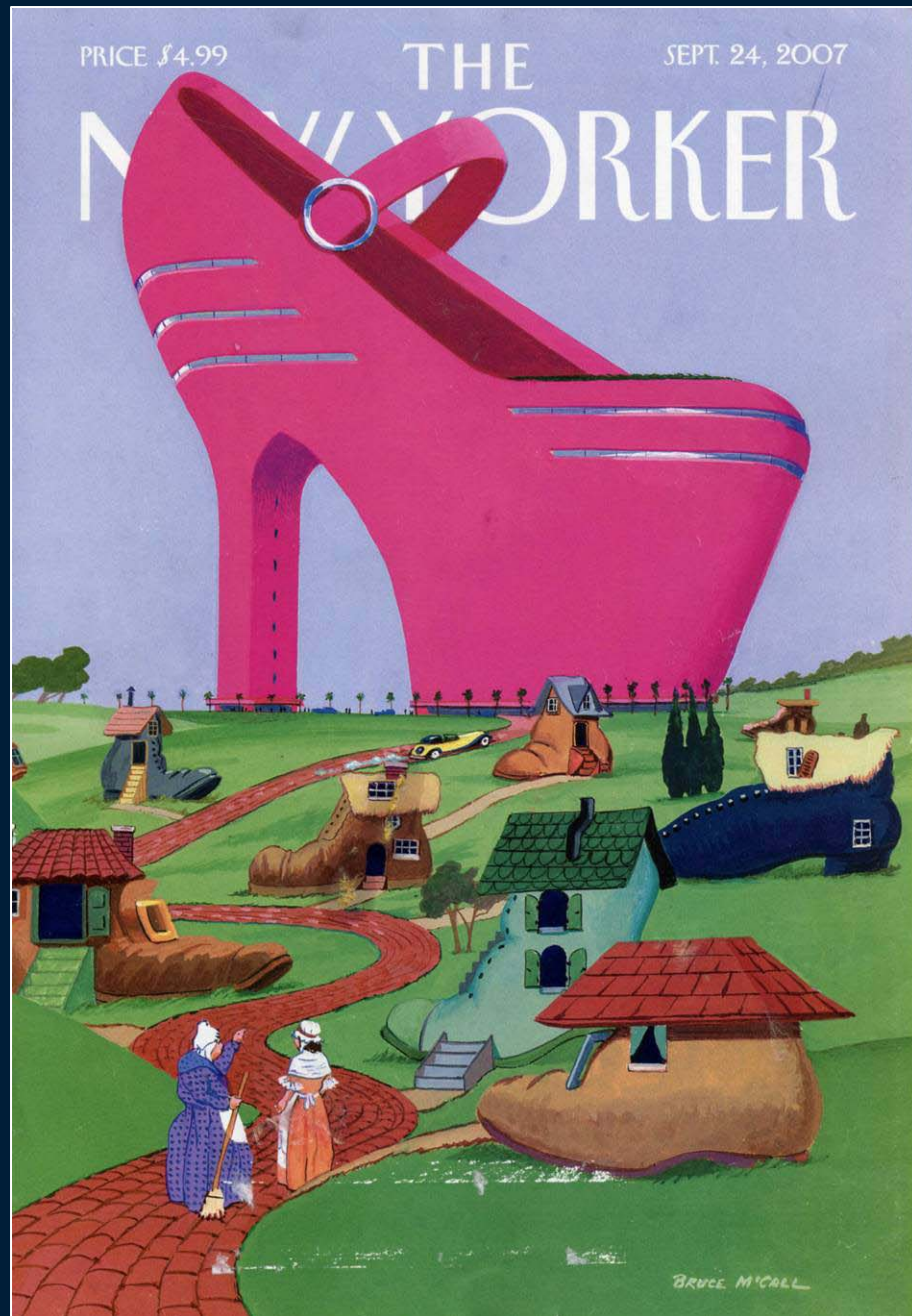
WHAT IS SUSTAINABILITY?

Source: UN World Commission on Environment and Development, 1987, The Brundtland Report



SUSTAINABLE DEVELOPMENT
WHAT ARE THE REALITIES? “If everyone in the world lived as we do in the UK, we’d need three planets to support us.”
-- One Planet Living

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®





NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

SUSTAINABLE DEVELOPMENT
ECONOMY
EQUITY
ENVIRONMENT

THE ECONOMICS OF PRESERVATION



- Spurs Economic Development
- Creates Skilled Jobs – Higher Pay
- Creates More Jobs Than New Construction
- Creates **Green** Collar Jobs

ECONOMIC BENEFITS OF PRESERVATION

**Historic preservation spurs
economic development.**

**Dollar for Dollar, preservation
creates more jobs than new
construction.**

**Preservation promotes service-
based economic development.**

SOCIAL BENEFITS OF PRESERVATION

Preservation is a powerful generator of affordable housing.

Preservation encourages social interaction and civic engagement.

Historic communities are valued for their quality of life.



GOALS

**MAKE THE CASE FOR PRESERVATION
AS INHERENTLY SUSTAINABLE
DEVELOPMENT & CRUCIAL TO
CONTROLLING CLIMATE CHANGE**



Brucemore, A National Trust Site, Cedar Rapids, Iowa

GOALS- PROMOTE

1. Building Reuse
2. Reinvestment in Older & Historic Communities
3. Greening the Existing Building Stock



Federal Courthouse, Tacoma, WA

BUILDING REUSE

1. Preserves Embodied Energy And Avoids New Impacts
2. Reduces Amount of New Waste Added to Landfills
3. Lessens Demand for New Materials



Downtown Galena, Illinois

REINVEST IN OLDER & HISTORIC COMMUNITIES

1. Preserves Embodied Energy & Avoids New Impacts
2. Reduces Demand for New Infrastructure



Old San Juan, Puerto Rico

GREEN THE EXISTING BUILDING STOCK

1. Traditional Historic Buildings were built to last
2. Many are already Energy Efficient



**Nakamura Courthouse,
Seattle
A LEED Silver GSA Project**

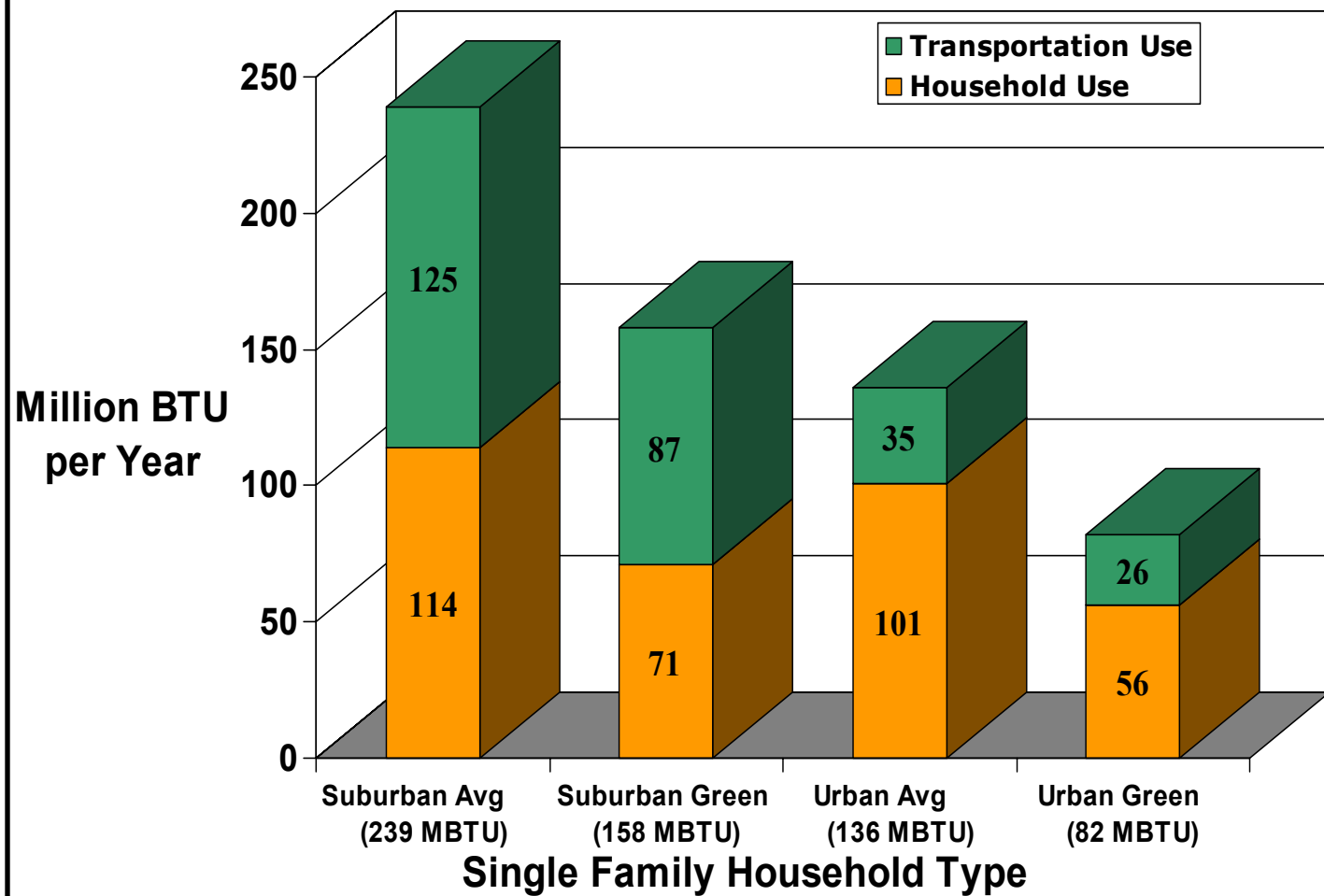
GREEN THE EXISTING BUILDING STOCK

- 3. Energy performance Can be improved**
- 4. Increasing Number of Historic buildings
are going green**

Source: Commercial Building Energy Consumption Survey, 2003
<http://www.eia.doe.gov/emeu/cbecs>

**Average energy consumption Btu/sq. ft
Commercial Buildings (non malls)**

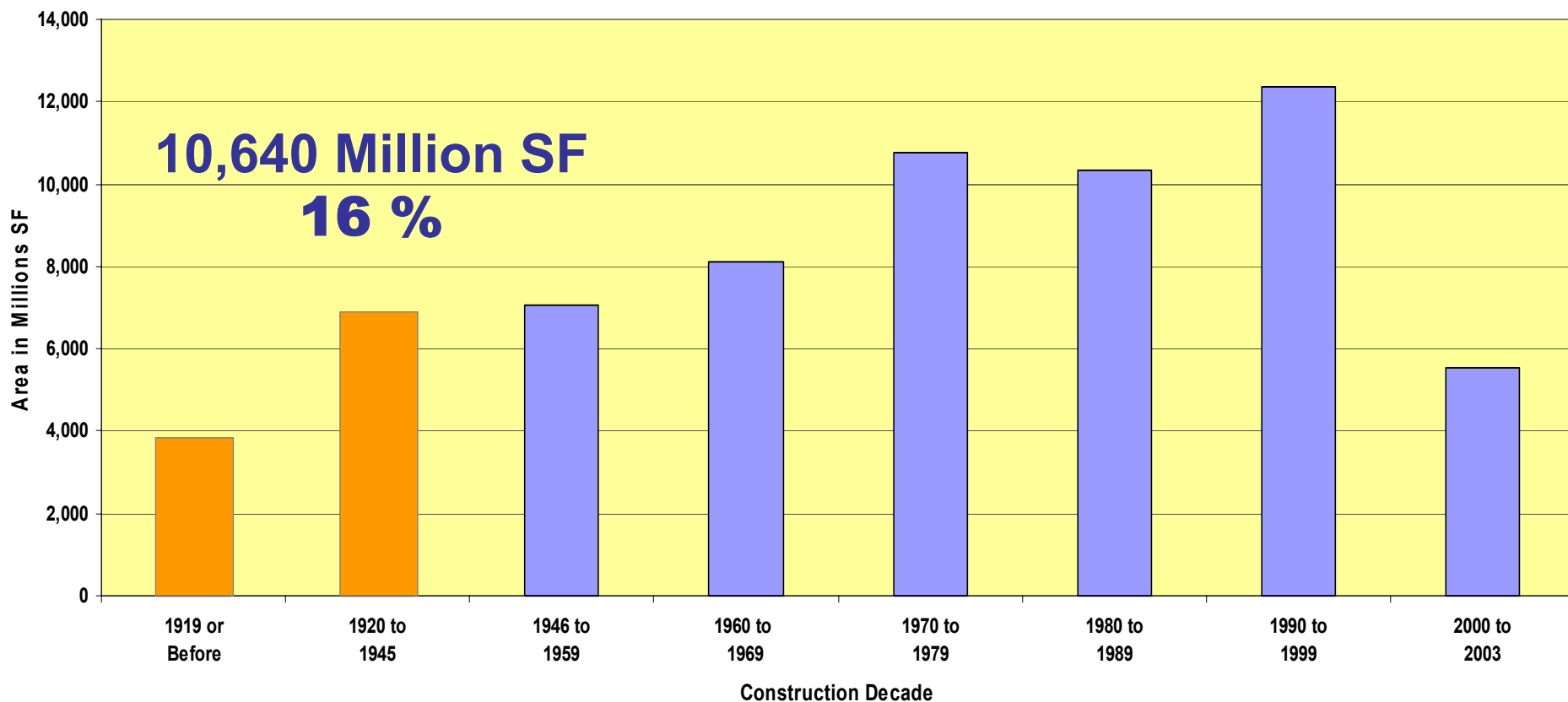
Before 1920	80,127
1920 – 1945	90,234
1946 – 1959	80,198
1960 – 1969	90,976
1970 – 1979	94,968
1980 – 1989	100,077
1990 – 1999	88,834
2000 – 2003	79,703



AVERAGE ENERGY USE BY COMMUNITY TYPE

“Historic” Buildings

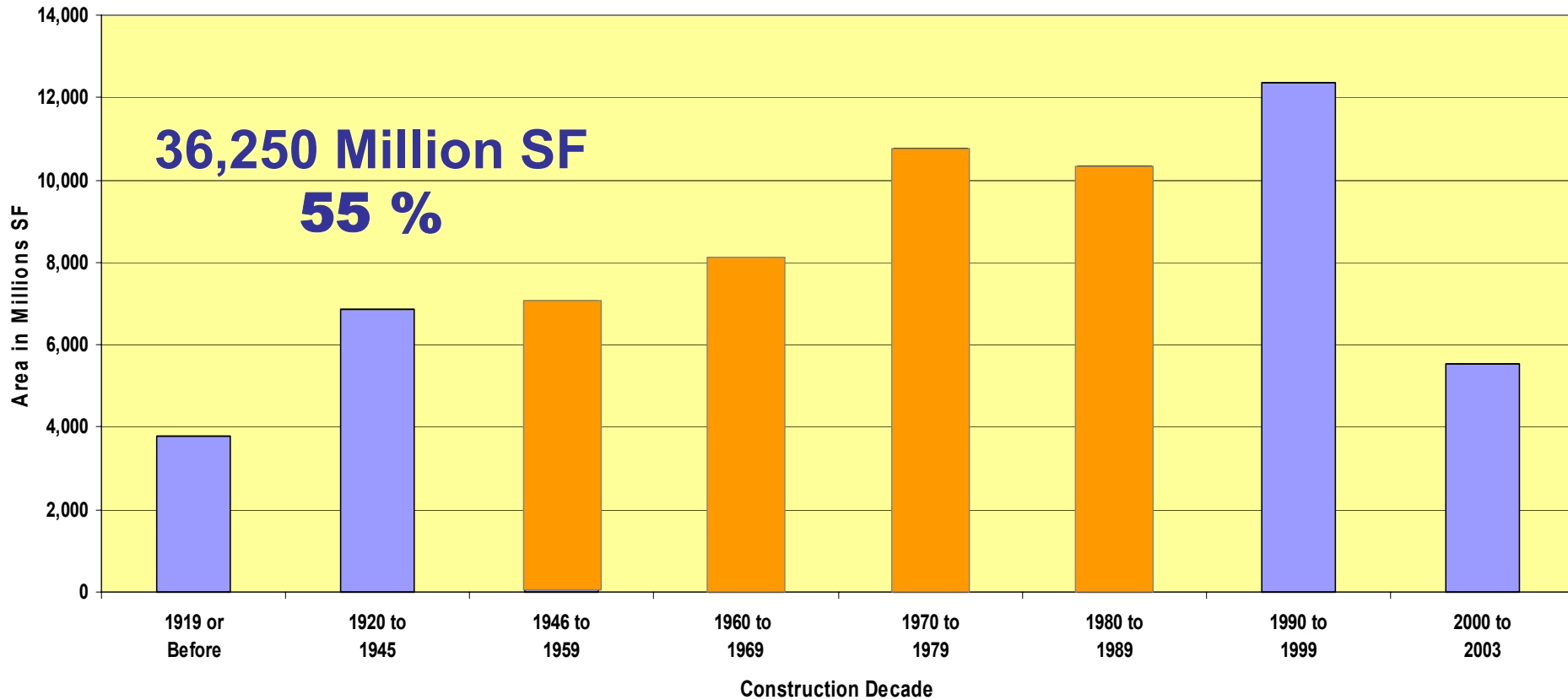
AREA: Non-Residential Buildings



Commercial Building Inventory
Department of Energy

Modern-Era Buildings

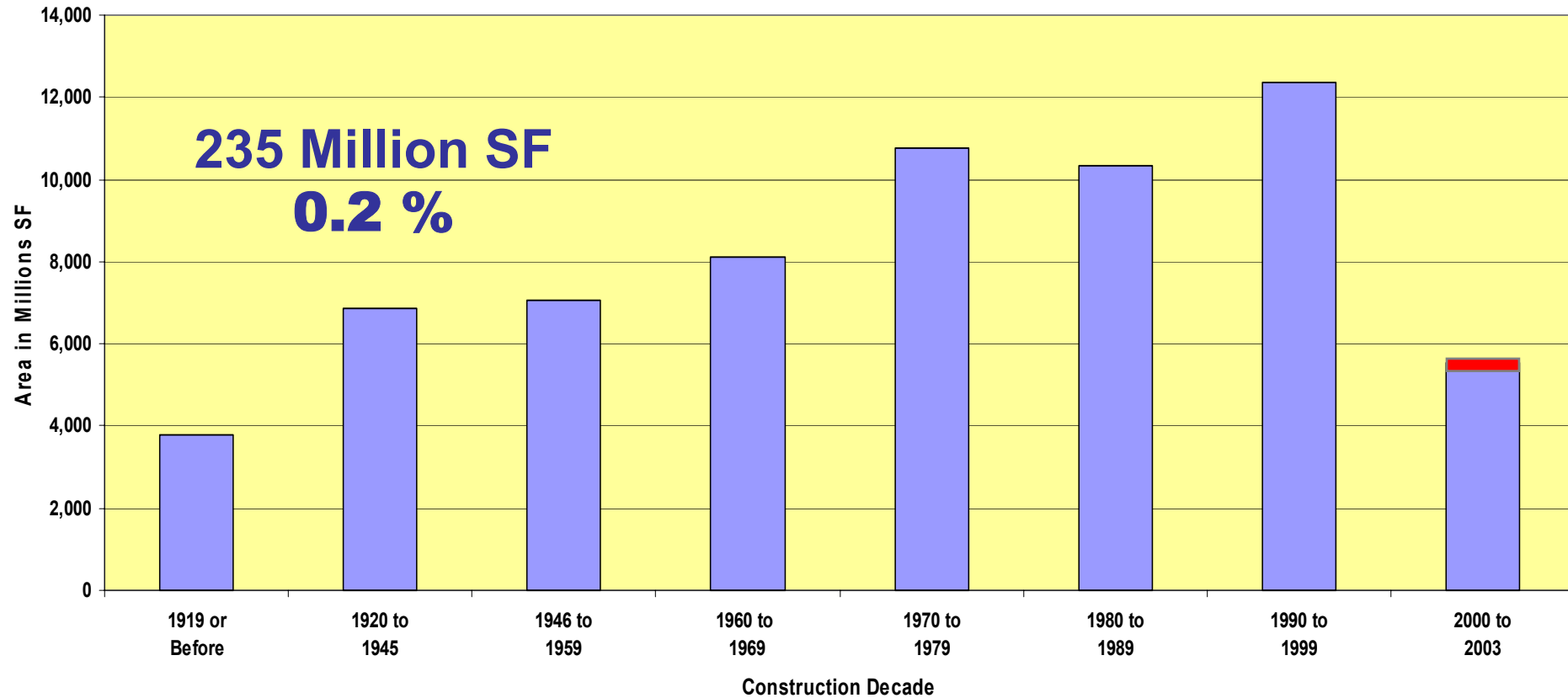
AREA: Non-Residential Buildings



Commercial Building Inventory
Department of Energy

LEED Buildings

AREA: Non-Residential Buildings



Commercial Building Inventory
Department of Energy

NATIONALTRUST.ORG/PRESERVATION

Preservation

THE MAGAZINE OF THE NATIONAL TRUST FOR HISTORIC PRESERVATION

THE GREEN ISSUE

The cost
of not going
green

Saving
Chicago's
bungalows—
and energy

Making your
house
sustainable:
10 tips

PLUS PRESIDENT
LINCOLN'S
COTTAGE OPENS
TO THE PUBLIC



THE NATIONAL TRUST'S SUSTAINABILITY INITIATIVE

A FOUR-PRONG PROGRAM

**Policy
Research**

**Outreach
Internal Practices**

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

POLICY – NTHP AGENDA

1. Incorporate Preservation Metrics into LEED.

2. Federal/State

Expand Historic Tax Credits.

Tax Credits for Green Rehabs.

3. Local

Ensure building codes are preservation friendly.

Encourage long range planning to target growth to existing communities.

Green Building Initiatives

Tybee Island, GA

Seattle

Portland, OR

General Services Administration

Washington, DC

Montgomery County, MD

Wisconsin

New York, NY

Washington State

Massachusetts

Austin, TX

Scottsdale, AZ

San Jose, CA

Nashville, TN

Honolulu, HI

Minneapolis, MN

Chicago, IL

US Department of Agriculture

Pennsylvania Public School Districts

Colorado



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

COLORADO

Senate bill 07-051

Any new or renovated building whose total project cost includes 25 percent or more in state funds to be designed and built to a 'high performance green building standard'.



WASHINGTON, DC

Green Building Act of 2006

Requires LEED compliance with municipal and private projects over 50,000 sq ft.



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

APT BULLETIN

Vol. XXXVI, No. 4

2005



THE SUSTAINABLE
PRESERVATION COALITION
THE SUSTAINABILITY INITIATIVE
NTHP, APT, AIA & NPS + GSA &
NCSHPO

environmental choices

**Reduce
Re-use
Re-cycle**

PRESERVATION CHOICES

**It is better to preserve than to repair,
better to repair than to restore, better to
restore than to reconstruct.**

N. Didron, 1839.



THE SUSTAINABLE PRESERVATION COALITION

HOW TO BEST INTEGRATE PRESERVATION & CULTURAL VALUES INTO LEED & GREEN RATING SYSTEMS

The United States Green Building Council (USGBC) is a community of leaders working to transform the way buildings and communities are designed, built, and operated.

WHAT IS LEED® AND THE US GREEN BUILDING COUNCIL?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria.

WHAT IS LEED® AND THE US GREEN BUILDING COUNCIL?

LEED & HISTORIC PRESERVATION

1. Overlooks the impact of projects on cultural value;
2. Does not effectively consider the performance, longer service lives and embodied energy of historic materials and assemblies;
3. And is overly focused on current or future technologies, neglecting how past experience helps to determine sustainable performance.

WHAT IS LEED ? WHAT IS THE U.S. GREEN BUILDING COUNCIL?

LEADERSHIP in ENERGY and ENVIRONMENTAL DESIGN

A leading-edge
system for
certifying
**DESIGN,
CONSTRUCTION,
& OPERATIONS**
of the greenest
buildings in the
world

Scores are tallied for
different aspects of
efficiency and design
in appropriate
categories.

For instance, LEED
assesses in detail:

1. Site Planning
2. Water Management
3. Energy Management
4. Material Use
5. Indoor
Environmental
Air Quality
6. Innovation &
Design Process

Green Facts

John M. Langston High School
Continuation & Langston-Brown
Community Center
Arlington, Virginia

LEED-NC rating out of 69

Silver 35

Sustainable Site 8

Water Efficiency 3

Energy & Atmosphere 4

Materials & Resources 6

Indoor Environmental
Quality 11

Innovation & Design 3

USGBC LEED-NC rated Sept. 3, 2003.



Levels of LEED Ratings

**Green Buildings
worldwide are certified
with a voluntary,
consensus-based
rating system.
USGBC has four
levels of LEED.**



Average Savings of Green Buildings



The infographic consists of four vertical bars of different colors and heights, each representing a category of savings. The first bar is orange and features a wind turbine background. The second is dark blue with a cloudy sky background. The third is light blue with a glass of water background. The fourth is medium blue with a recycling symbol background. Each bar has a large white arrow pointing downwards at the bottom. The savings percentages are displayed in dark blue text below the category names.

ENERGY SAVINGS
30%

CARBON SAVINGS
35%

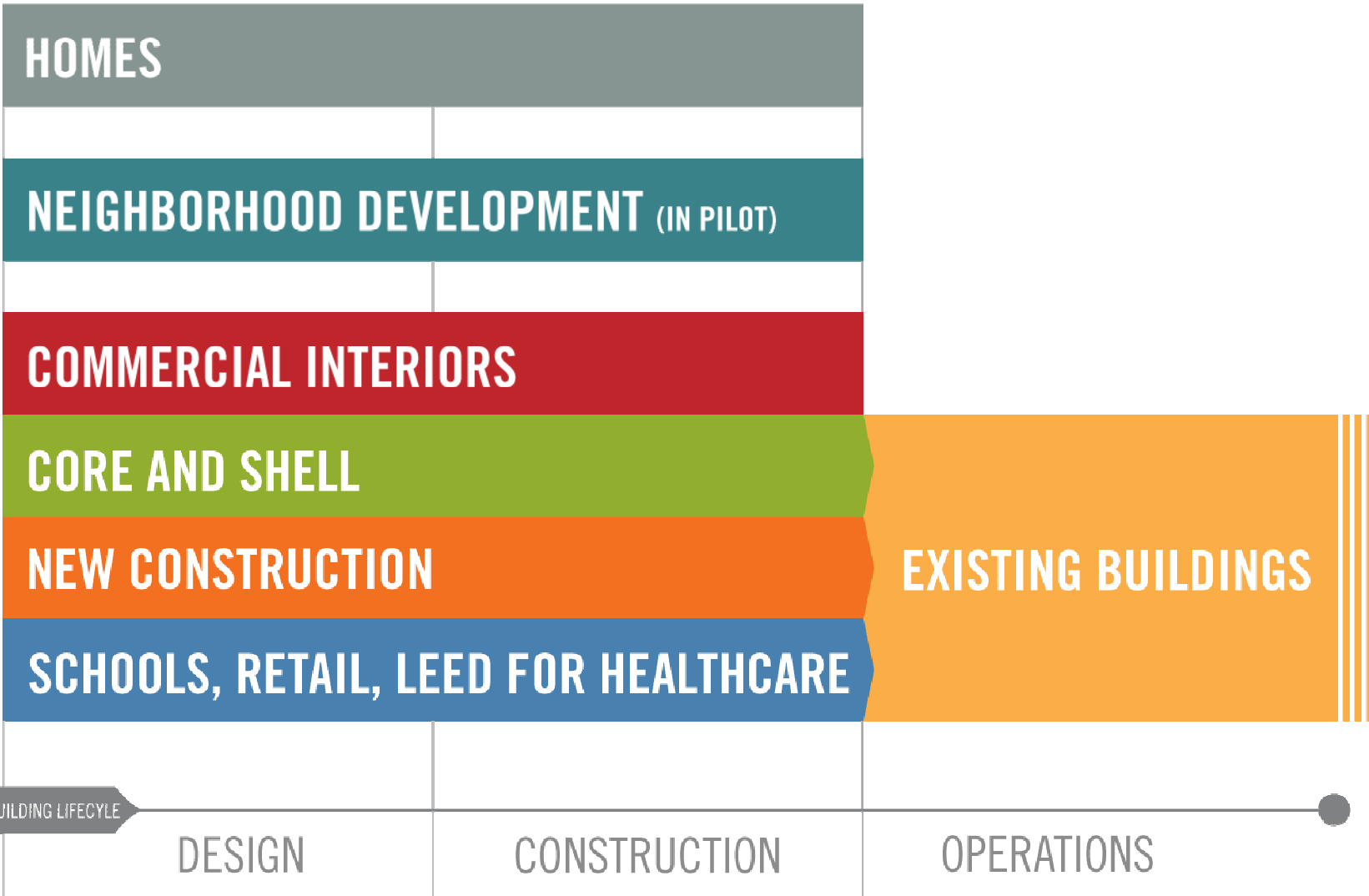
WATER USE SAVINGS
30-50%

WASTE COST SAVINGS
50-90%



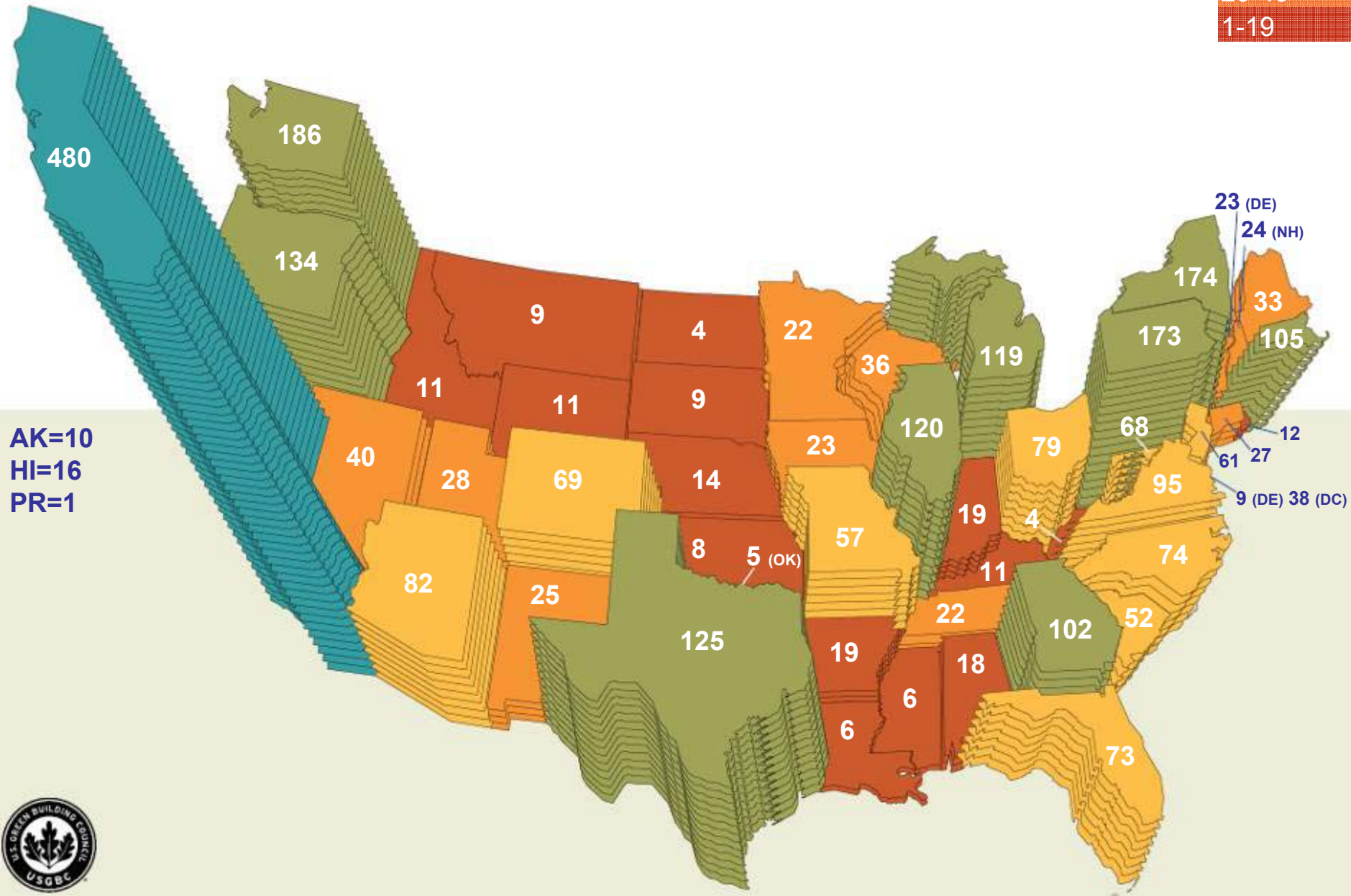
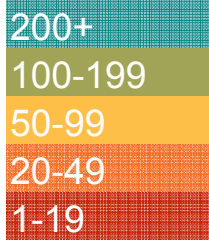
Source:
Capital E

**LEED addresses the
complete lifecycle
of buildings:**



LEED for new construction buildings as of 07/06

Distribution
by geography



THE NATIONAL TRUST & THE US GREEN BUILDING COUNCIL

Building a Partnership

Changing the Face of LEED





REVISING LEED – LEED 3.0

Changing LEED to a weighted system
based on LCA Indicators &
Preservation/Social/Cultural Metrics

LEED SYSTEM IS POINT BASED



LEED-NC

LEED-NC Version 2.2 Registered Project Checklist

April 12, 2008 Status during Construction Submittal Prep

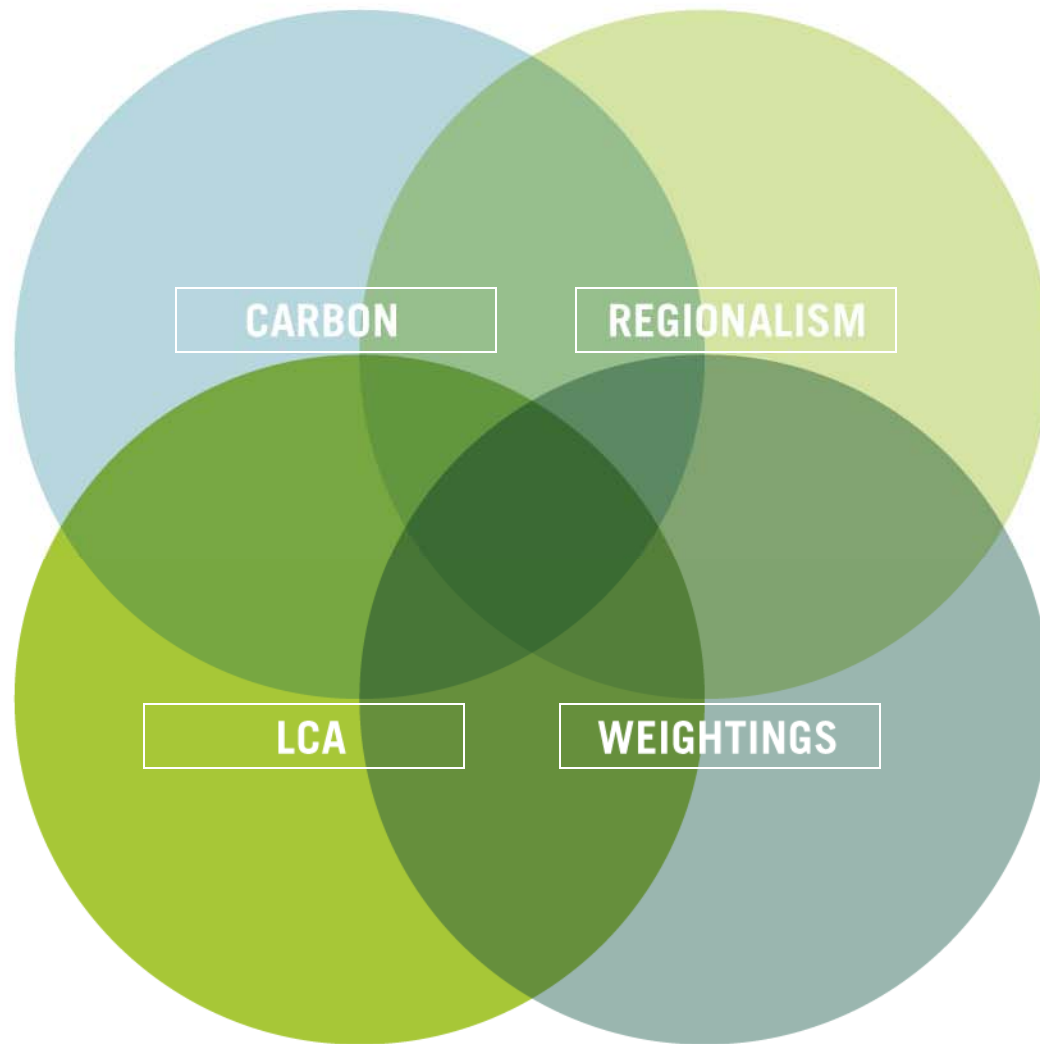
Lincoln Cottage - Visitor Education Center

Washington DC

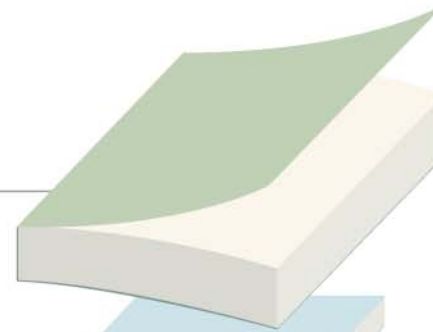
Sustainable Sites		Yes	Likely	Possible	No	Responsible Party	Notes	USGBC Submittal Stage	10-25-2007 Status
Prerequisite 1	Construction Activity Pollution Prevention					Heritage Landscapes	Documentation completed	Construction	
Credit 1	Site Selection	1	1			NTHP		Construction	
Credit 2	Development Density & Community Connectivity	1	1			Heller		Design	Earned per USGBC
Credit 3	Brownfield Redevelopment	1			1	Heller			
Credit 4.1	Alternative Transportation, Public Transportation Access	1	1			Heller		Design	Earned per USGBC
Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1	1			Heller		Design	Earned per USGBC
Credit 4.3	Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles	1			1	Heller			
Credit 4.4	Alternative Transportation, Parking Capacity	1	1			Heller		Construction	
Credit 5.1	Site Development, Protect or Restore Habitat	1			1	Heller			
Credit 5.2	Site Development, Maximize Open Space	1	1			Heller		Construction	
Credit 5.3	Stormwater Design, Quantity Control	1	1			Heller		Design	Earned per USGBC
Credit 5.4	Stormwater Design, Quality Control	1	1			Heller	Documentation completed		
Credit 7.1	Heat Island Effect, Non-Roof	1	1			Heller		Construction	
Credit 7.2	Heat Island Effect, Roof	1			1	Heller			
Credit 8	Light Pollution Reduction	1			1	Heller			
SS Possible Points		14	9		5				

Water Efficiency		Yes	Likely	Possible	No	Responsible Party			
Credit 1.1	Water Efficient Landscaping, Reduce by 50%	1	1			Heller		Design	Earned per USGBC
Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation	1	1			Heller		Design	Earned per USGBC
Credit 2	Innovative Wastewater Technologies	1			1	Heller			
Credit 3.1	Water Use Reduction, 30% Reduction	1	1			Heller		Design	Earned per USGBC
Credit 3.2	Water Use Reduction, 30% Reduction	1	1			Heller		Design	Earned per USGBC
WE Possible Points		5	4		1				

Energy & Atmosphere		Yes	Likely	Possible	No	Responsible Party			
Prerequisite 1	Fundamental Commissioning of Building Energy Systems					TCC & Seabate-B	Contracted - Template & documentation required	Construction	
Prerequisite 2	Minimum Energy Performance					Heller		Design	Earned per USGBC
Prerequisite 3	Fundamental Refrigerant Management					Heller		Design	Earned per USGBC
Credit 1.1	Optimize Energy Performance, 10.50% New / 3.50% Exst.	1	1			Heller		Design	Earned per USGBC
Credit 1.2	Optimize Energy Performance, 14.00% New / 7.00% Exst.	1	1			Heller		Design	Earned per USGBC
Credit 1.3	Optimize Energy Performance, 17.50% New / 10.50% Exst.	1	1			Heller		Design	Earned per USGBC
Credit 2.1	Onsite Renewable Energy, 2.5%	1			1	NTHP/Heller			
Credit 2.2	Onsite Renewable Energy, 7.5%	1			1	NTHP/Heller			
Credit 2.3	Onsite Renewable Energy, 12.5%	1			1	NTHP/Heller			
Credit 3	Enhanced Commissioning	1	1			TCC & Seabate-B	Contracted - Template & documentation required	Construction	
Credit 4	Enhanced Refrigerant Management	1	1			Heller		Design	Earned per USGBC
Credit 5	Measurement & Verification	1			1	NTHP/Heller			
Credit 6	Green Power 35%	1			1	NTHP/TCC	Renewable Choice Energy Proposal ~\$794.30	Construction	
EA Possible Points		17	5		12				



FLEXIBLE



ADAPTIVE



ELEGANT IN DESIGN



EASIER TO USE

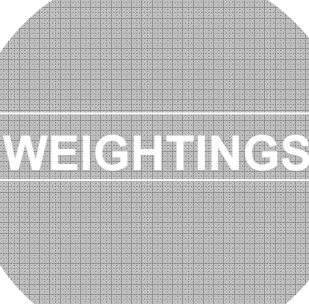


TECHNICALLY RIGOROUS



CONSENSUS BASED





WEIGHTINGS

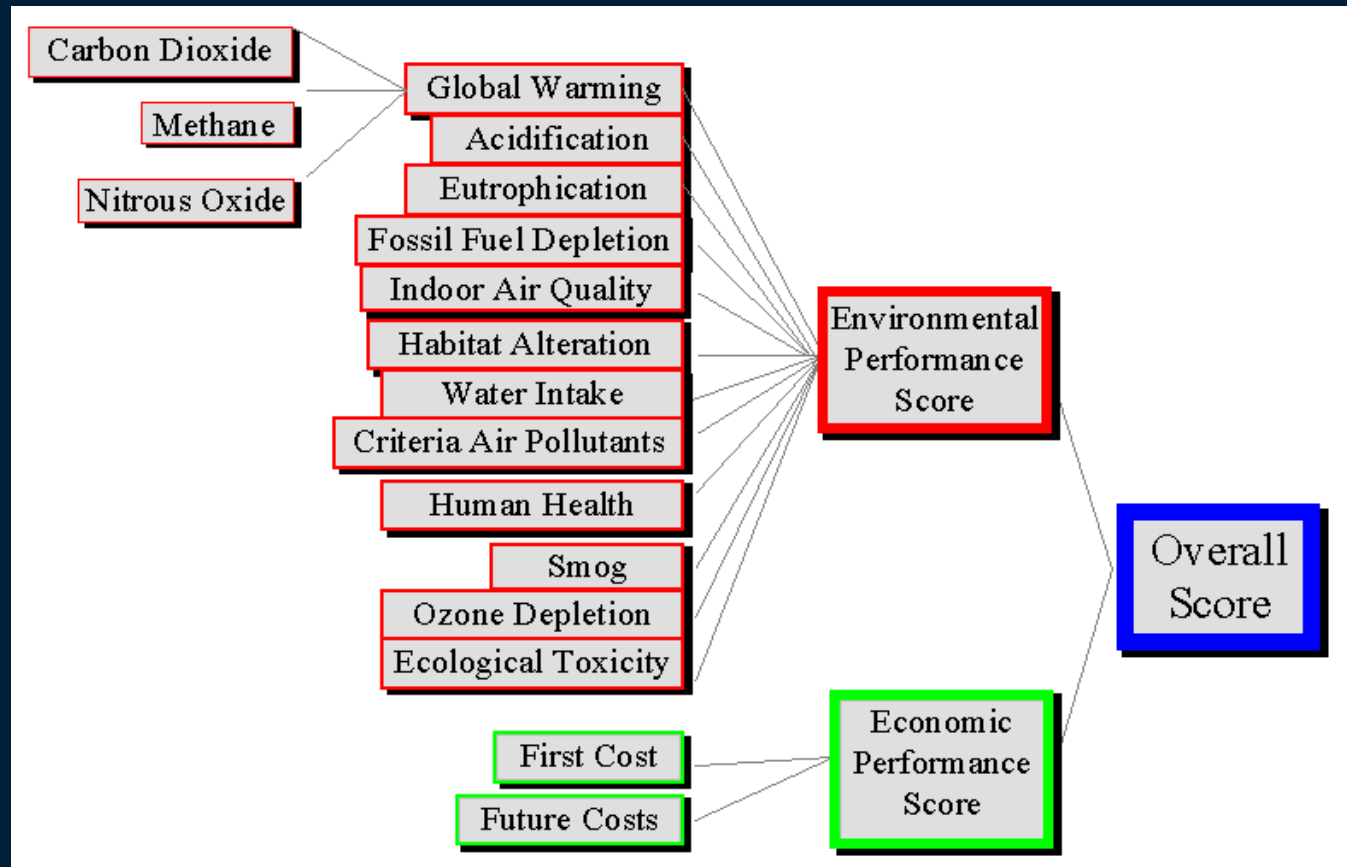
LEED Weighted Credits

		Indicator Weighting													
		29%	10%	9%	8%	8%	7%	6%	6%	5%	4%	3%	3%	2%	
		Climate Change	Resource Depletion Fossil Fuel	Human Health Criteria Pollutants	Water Intake	Human Health Cancerous Effects	Ecological Toxicity	Eutrophication	Habitat Alteration	Human Health Noncancerous Effects	Photochemical Oxidant (smog) Formation	Acidification	Indoor Air Quality	Stratospheric Ozone Depletion	Credit / Category Total
indicator totals		100	100	100	100	100	100	100	100	100	100	100	100	100	
SS	Category	Sustainable Sites													29.46
SS	Prereq 1	Erosion & Sedimentation Control													0.6
SS	Credit 1		5	5					25				5		2
SS	Credit 2	Development Density & Community Connectivity													5.75
SS	Credit 3		5	5		4	12		10	5					2.96
SS	Credit 4.1	Alternative Transportation, Public Transportation Access													4.08
SS	Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms													2.89
SS	Credit 4.3	Alternative Transportation, Low-Emitting and Fuel-Efficient Vehicles													3.71
SS	Credit 4.4	Alternative Transportation, Parking Capacity													2.69
SS	Credit 5.1		5												0.5
SS	Credit 5.2		5					25							2
SS	Credit 6.1	Stormwater Design, Quantity Control													1.79
SS	Credit 6.2						7								0.49
SS	Credit 7.1	Heat Island Effect, Non-Roof													
SS	Credit 7.2	Heat Island Effect, Roof													
SS	Credit 8	Light Pollution Reduction													
WE	Category	Water Efficiency													14.34
WE	Credit 1.1	Water Efficient Landscaping, Reduce by 50%													4.095
WE	Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation													5.695
WE	Credit 2	Innovative Wastewater Technologies													0.35
WE	Credit 3.1		5		25										2.5
WE	Credit 3.2		5		15										1.7
EA	Category	75	10	25		15	15			20	20	50		98	32.51
EA	Prereq 1	Fundamental Building Systems Commissioning													
EA	Prereq 2														
EA	Prereq 3	CFC Reduction in HVAC&R Equipment													1
EA	Credit 1	75	10	25		5	5			5	20	25		50	27.55
EA	Credit 2	Renewable Energy, 1 to 3 possible points													
EA	Credit 3	Additional Commissioning													48
EA	Credit 4	Ozone Depletion													
EA	Credit 5	Measurement & Verification													



WHAT IS LIFE CYCLE ASSESSMENT?

A methodology for assessing the environmental performance of a product over its full life cycle



LIFE CYCLE ANALYSIS

LCA INDICATORS AND US NEPA NIST
BEES – BUILDING FOR ENVIRONMENTAL
AND ECONOMIC SUSTAINABILITY

LCA METRICS

1. Reduced Carbon Footprint/Construction Process
2. Reduced Carbon Footprint Operations & Livability
3. Durability
4. Life Cycle Flexibility



It takes energy to construct a new building.
It saves energy to preserve an old one.

REDUCED CARBON FOOTPRINT CONSTRUCTION PROCESS

METRIC NUMBER ONE
AN LCA - BASED METRIC



REDUCED CARBON FOOTPRINT **CONSTRUCTION PROCESS**

Recognize impacts that are avoided by the reuse of existing buildings, such as the preservation of embodied energy, avoidance of waste generation, and reduction in the production of pollution.



WHAT IS EMBODIED ENERGY?

The energy required to extract, process, manufacture, transport and install building materials.



Acoma Pueblo, New Mexico

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

EMBODIED ENERGY

Conserving buildings preserves embodied energy, and reduces the need for new materials.



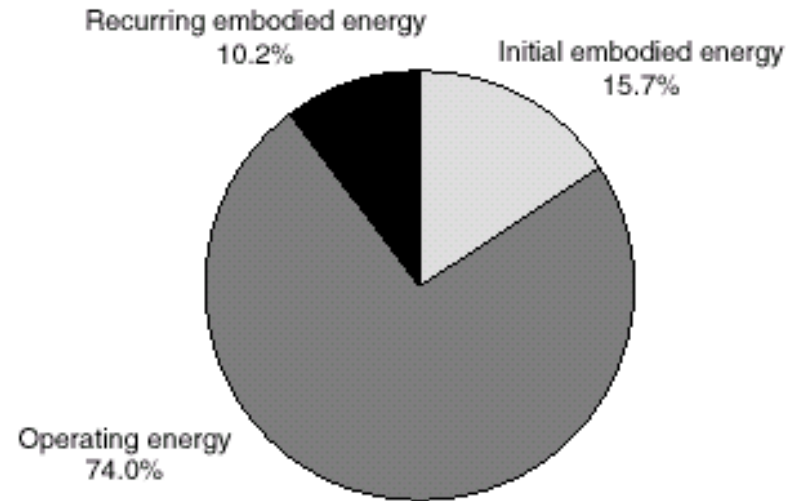
Teapot Dome Gas Station, Zillah, WA

WHAT IS EMBODIED ENERGY?

The embodied energy of a typical mid-20th century building is equal to 5-15 gallons of gasoline per square foot.*

* 1 gallon = 125,000 Btu

Figure 3: Distribution of Life-cycle Energy Consumption.



Athena Sustainable Materials Institute <http://www.athenasmi.ca/about>



King William Historic District, San Antonio, Texas

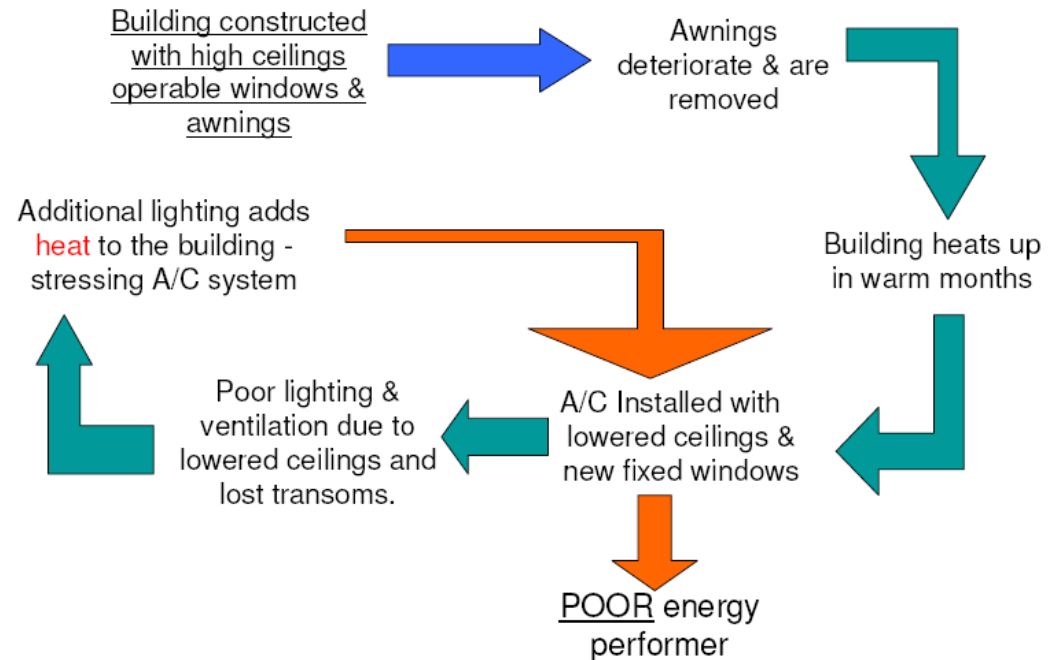
REDUCED CARBON FOOTPRINT OPERATIONS AND LIVABILITY

METRIC NUMBER TWO
AN LCA - BASED METRIC

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

Historic Energy & Atmosphere

Minimum Energy Performance:



HISTORIC ENERGY & ATMOSPHERE

WE HAVE FORGOTTEN HOW TO LIVE IN OUR ENVIRONMENT



Noto, Sicily

DURABILITY*

METRIC NUMBER THREE
AN LCA - BASED METRIC

*Already being integrated into LEED 3.0/2009



Old San Juan, Puerto Rico

DURABILITY

Identify the relative durability of various materials, systems and assemblies and reward buildings whose components are more durable.



City Hall, Noto, Sicily

LIFE CYCLE FLEXIBILITY

METRIC NUMBER FOUR
AN LCA - BASED METRIC



LIFE CYCLE FLEXIBILITY

Recognize the multiple reuses and adaptability of historic building types which extends the life cycle of buildings, the building stock and our communities.

Non-LCA METRICS

1. Social Sustainability
2. Health & Comfort
3. Social Capital
4. Density

How to Quantify the
Unquantifiable?

INTEGRATING PRESERVATION
METRICS INTO LEED



Griffith Observatory, Los Angeles

SOCIAL SUSTAINABILITY

METRIC NUMBER FIVE A NON-LCA BASED METRIC



Pioneer Courthouse, Portland, OR

SOCIAL SUSTAINABILITY

Celebrate existing buildings and provide more reward for the recognized sites of architectural, cultural and social significance using nationally recognized standards and criteria.



Cliff Palace, Mesa Verde, Colorado

HEALTH AND COMFORT

METRIC NUMBER SIX A NON-LCA BASED METRIC



Typical Courtyard, Old San Juan, Puerto Rico

HEALTH AND COMFORT

Recognize the high degree of individual controllability in historic and existing buildings.



Downtown Manitou Springs, Colorado

SOCIAL CAPITAL

METRIC NUMBER SEVEN
A NON-LCA BASED METRIC



Old San Juan, Puerto Rico

SOCIAL CAPITAL

Recognize the importance of “social capital” associated with historic buildings and neighborhoods.



Middle School, Boulder, Colorado

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

HISTORIC NEIGHBORHOOD SCHOOLS

In the Year 2000 – were placed on the
Trust's 11 Most Endangered List



Middle School, Boulder, Colorado

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

HISTORIC NEIGHBORHOOD SCHOOLS

In the Year 2000 – were placed on the
Trust's 11 Most Endangered List



Gratteri, Sicily

DENSITY

METRIC NUMBER EIGHT
A NON-LCA BASED METRIC



DENSITY

Places like Boulder are town-centered, transit and pedestrian oriented, have a greater mix of housing, commercial and retail uses and preserve open spaces.



SPRAWL

Historic preservation reduces sprawl.



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

www.sprawlcity.org

100 largest areas of sprawl in the US –

Atlanta is #1 – Seattle is #26



Lionetti House, New Canaan, CT

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

SPRAWL

Working with the Smart Growth Network to reduce pressure for development in the suburbs & on the urban fringe.



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

SPRAWL vs. Historic Preservation
Promotes reinvestment in existing
Neighborhoods, but NOT with
McMansions and Teardowns.

THE NATIONAL TRUST & THE US GREEN BUILDING COUNCIL

Building a Partnership

Changing the Face of LEED

LEED 3.0/2009

Weighting using LCA

Alternative Compliance using

Durability of Materials

LEED 3.0/2010

Preservation/Social Metrics





NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

PRESIDENT LINCOLN'S COTTAGE

ON TARGET FOR A GOLD LEED RATING
FOR THE VISITOR EDUCATION CENTER
ON THE SITE

LEED SYSTEM IS POINT BASED

Materials & Resources		Yes	Likely	Possible	No	Responsible Party			
Prereq 1	Storage & Collection of Recyclables					NTHP/Hiler		Design	Earned per USGBC
Credit 1.1	Building Reuse, Maintain 75% of Existing walls, Floors & Roof	1	1			Hiler	Documentation completed	Construction	
Credit 1.2	Building Reuse, Maintain 100% of Existing walls, Floors & Roof	1	1			Hiler	Documentation completed	Construction	
Credit 1.3	Building Reuse, Maintain 50% of Interior Non-Structural Elements	1	1			Hiler	Documentation completed	Construction	
Credit 2.1	Construction Waste Management, Divert 50% from Disposal	1	1			TCC	Documentation completed	Construction	
Credit 2.2	Construction Waste Management, Divert 75% from Disposal	1			1	TCC			
Credit 3.1	Material Reuse, 5%	1	1			TCC	Documentation completed	Construction	
Credit 3.2	Material Reuse, 10%	1	1			Hiler	Documentation completed		
Credit 4.1	Recycled Content, 10% (post-consumer + 1/2 pre-consumer)	1	1			TCC	Documentation completed	Construction	
Credit 4.2	Recycled Content, 20% (post-consumer + 1/2 pre-consumer)	1			1	TCC		Construction	
Credit 5.1	Regional Materials, 10% Extracted, Processed & Manufactured Regionally	1	1			TCC	Documentation completed	Construction	
Credit 5.2	Regional Materials, 20% Extracted, Processed & Manufactured Regionally	1	1			Hiler	Documentation completed		
Credit 6	Rapidly Renewable Materials	1			1	Hiler			
Credit 7	Certified Wood	1			1	TCC		Construction	
MR Possible Points		13	0		4				
Indoor Environmental Quality		Yes	Likely	Possible	No	Responsible Party			
Prereq 1	Minimum IAQ Performance					Hiler		Design	Earned per USGBC
Prereq 2	Environmental Tobacco Smoke (ETS) Control					NTHP		Design	Earned per USGBC
Credit 1	Outdoor Air Delivery Monitoring	1	1			Hiler		Design	Earned per USGBC
Credit 2	Increased Ventilation	1	1			Hiler		Design	Earned per USGBC
Credit 3.1	Construction IAQ Management Plan, During Construction	1	1			TCC	Documentation completed	Construction	
Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1	1			TCC	Documentation completed	Construction	
Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1	1			TCC	Documentation completed	Construction	
Credit 4.2	Low-Emitting Materials, Paints & Coatings	1	1			TCC	Documentation completed	Construction	
Credit 4.3	Low-Emitting Materials, Carpet Systems	1	1			TCC	Documentation completed	Construction	
Credit 4.4	Low-Emitting Materials, Composite Wood & Agglomerate Products	1	1			TCC	Documentation completed	Construction	
Credit 5	Indoor Chemical & Pollutant Source Control	1			1	Hiler			
Credit 6.1	Controllability of Systems, Lighting	1	1			TCC	Documentation completed	Design	
Credit 6.2	Controllability of Systems, Thermal Control	1	1			TCC	Documentation completed	Design	
Credit 7.1	Thermal Comfort, Design	1			1	Hiler			
Credit 7.2	Thermal Comfort, Verification	1			1				
Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1	1			Hiler		Design	Earned per USGBC
Credit 8.2	Daylight & Views, Views for 90% of Spaces	1	1			Hiler		Design	Earned per USGBC
EQ Possible Points		15	12		3				
Innovation & Design Process		Yes	Likely	Possible	No	Responsible Party			
Credit 1.1	Innovation in Design, "LEED Educational Signage/Posters"	1	1			TCC	TCC has written case study and tour handouts	Construction	
Credit 1.2	Innovation in Design, Green Housekeeping	1	1			NTHP	Documentation completed	Construction	
Credit 1.3	Innovation in Design, Exemplary Performance in Water Reduction	1	1			TCC	Achieved 44.2% water use reduction. Need to install correct equip.	Design	Earned per USGBC
Credit 1.4	Innovation in Design, Exemplary Performance in Non-Roof Heat Island Eff.	1	1			TCC	Achieved 100% with new concrete	Construction	
Credit 2	LEED™ Accredited Professional	1	1			TCC		Design	Earned per USGBC
ID Possible Points		5	5						
Total Possible Points		89	44		25				
Certified 26-32 points Silver 33-38 points Gold 39-51 points									



HISTORIC REHABILITATION TAX CREDITS

THE ARMORY IN PORTLAND

The first LEED Platinum/Tax Credit
Project

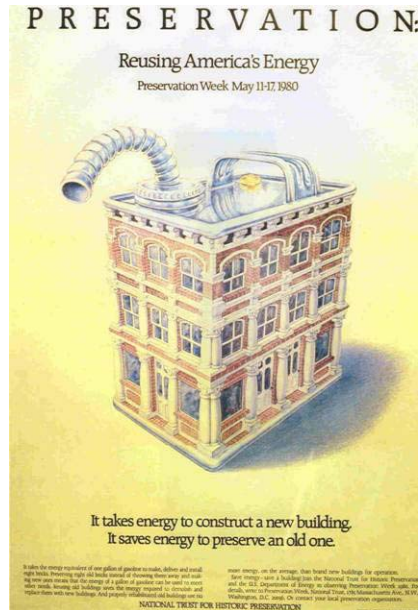
NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®



HISTORIC REHABILITATION TAX CREDITS

THE ARMORY IN PORTLAND

**The first LEED Platinum/Tax Credit
Project**



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

Lessons Learned:

LEED + HP? Not difficult.

LEED Certification costs \$.
Commissioning is good.

Adaptive use: green.

Historic Preservation sustains culture,
heritage, & quality of life.

The Greenest Building is the
one that's already been built.

Carl Elefante, Quinn Evans / Architects



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

RESEARCH

Conserving energy in historic buildings

3 PRESERVATION BRIEFS

Conserving Energy in Historic Buildings

Baird M. Smith, AIA

U.S. Department of the Interior National Park Service
Preservation Assistance Division Technical Preservation Services

With the dwindling supply of energy resources and new efficiency demands placed on the existing building stock, many owners of historic buildings and their architects are assessing the ability of these buildings to conserve energy with an eye to improving thermal performance. This brief has been developed to assist those persons attempting energy conservation measures and weatherization improvements such as adding insulation and storm windows or caulking of exterior building joints. In historic buildings, many measures can result in the inappropriate alteration of important architectural features, or, perhaps even worse, cause serious damage to the historic building materials through unwanted chemical reactions or moisture-caused deterioration. This brief recommends measures that will achieve the greatest energy savings with the least alteration to the historic buildings, while using materials that do not cause damage and that represent sound economic investments.

Inherent Energy Saving Characteristics of Historic Buildings

Many historic buildings have energy-saving physical features and devices that contribute to good thermal performance. Studies by the Energy Research and Development Adminis-

tration (see bibliography) show that the buildings with the poorest energy efficiency are actually those built between 1940

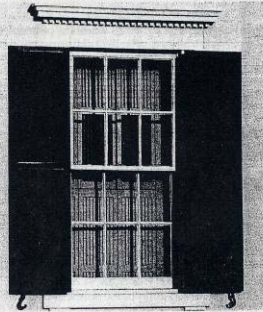


Figure 2. Shutters can be used to minimize the problem of summer heat gain by shading the windows. If operable shutters are in place, their use will help reduce the summer cooling load. (Photo: Baird Smith) and 1975. Older buildings were found to use less energy for heating and cooling and hence probably require fewer weatherization improvements. They use less energy because they were built with a well-developed sense of physical comfort and because they maximized the natural sources of heating, lighting and ventilation. The historic building owner should understand these inherent energy-saving qualities.

The most obvious (and almost universal) inherent energy saving characteristic was the use of operable windows to provide natural ventilation and light. In addition, historic commercial and public buildings often include interior light-ventilation courts, roof-top ventilators, clerestories or skylights (see figure 1). These features provide energy efficient fresh air and light, assuring that energy consuming mechanical devices may be needed only to supplement the natural energy sources. Any time the mechanical heating and air conditioning equipment can be turned off and the windows opened, energy will be saved.

1

Its been 20 years since Preservation Brief 3 was written. Its topics are still valid today:

Inherent Energy Saving Characteristics

- Passive Measures
- Preservation Retrofitting
- Retrofitting Measures
- Mechanical Equipment



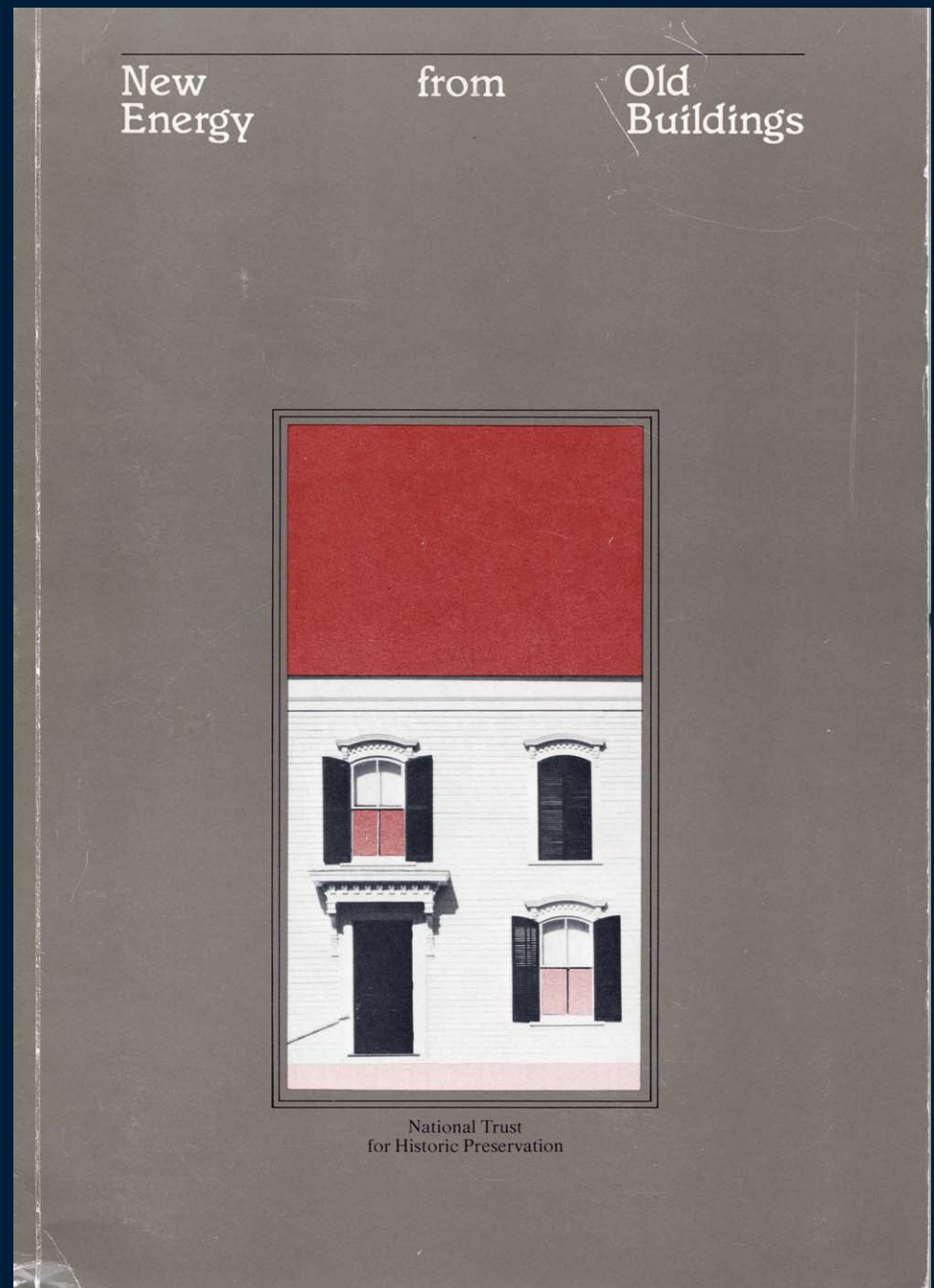
Figure 1. This 1891 Courthouse and Post Office in Rochester, New York, has built-in energy conserving features such as, heavy masonry walls, operable windows, an interior skylighted atrium which provides light and ventilation, and roof-top ventilators which keep the building cooler in the summer. Also note the presence of awnings in this old photograph.

new energy from old buildings

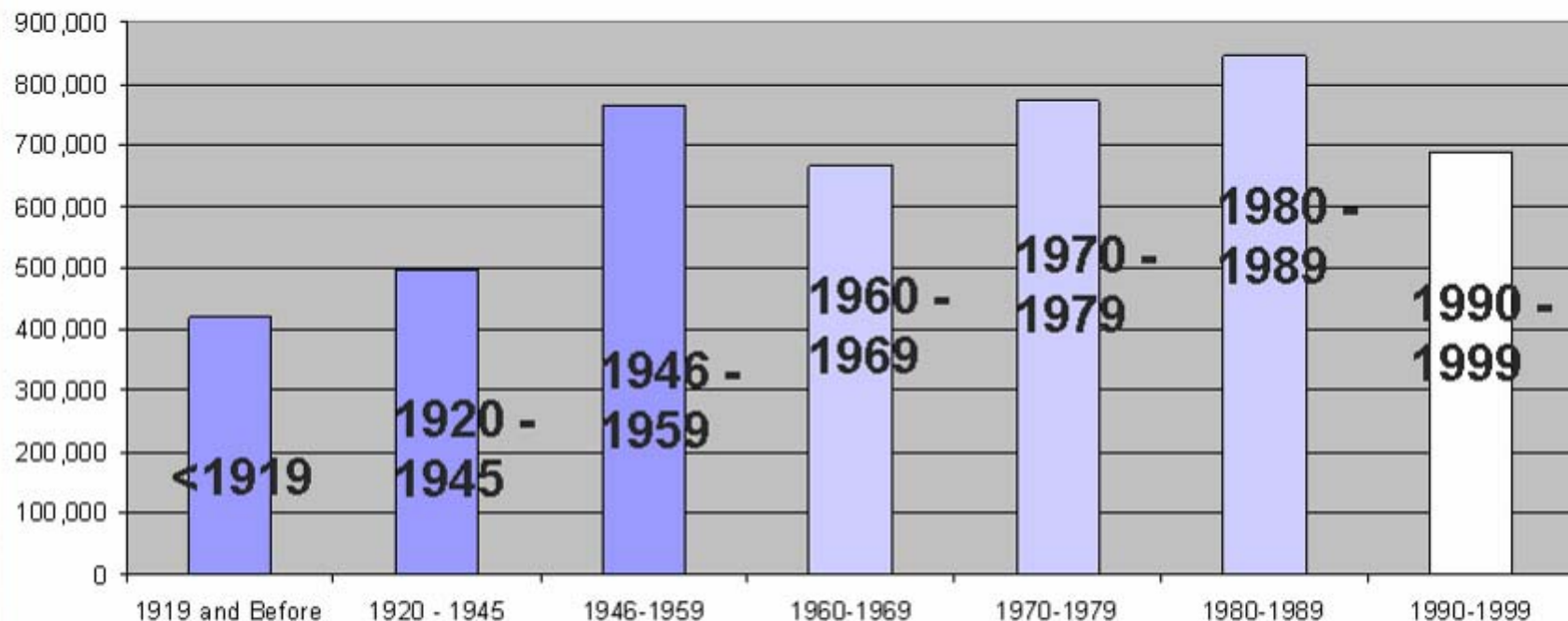
National Trust, 1981

Embodied Energy Assessment Methods and Case Studies

Summary of study done by
Advisory Council on
Historic Preservation



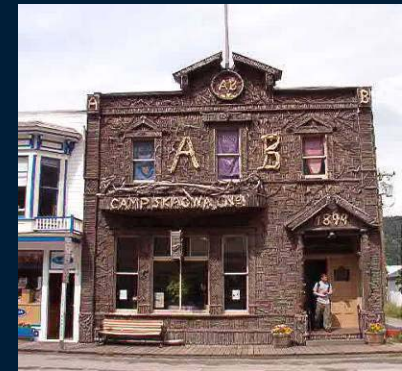
Existing Building Stock



Department of Energy Commercial Building Inventory

The existing buildings of America have an embodied energy greater than the world's total annual energy production – ACHP, 1979

“While it may seem intuitively obvious that retaining and renovating older buildings has environmental merit, the case is difficult to prove without access to the appropriate data and tools.” -- Wayne Trusty, President, Athena Institute



PRESERVATION: THE ENVIRONMENTAL MERITS

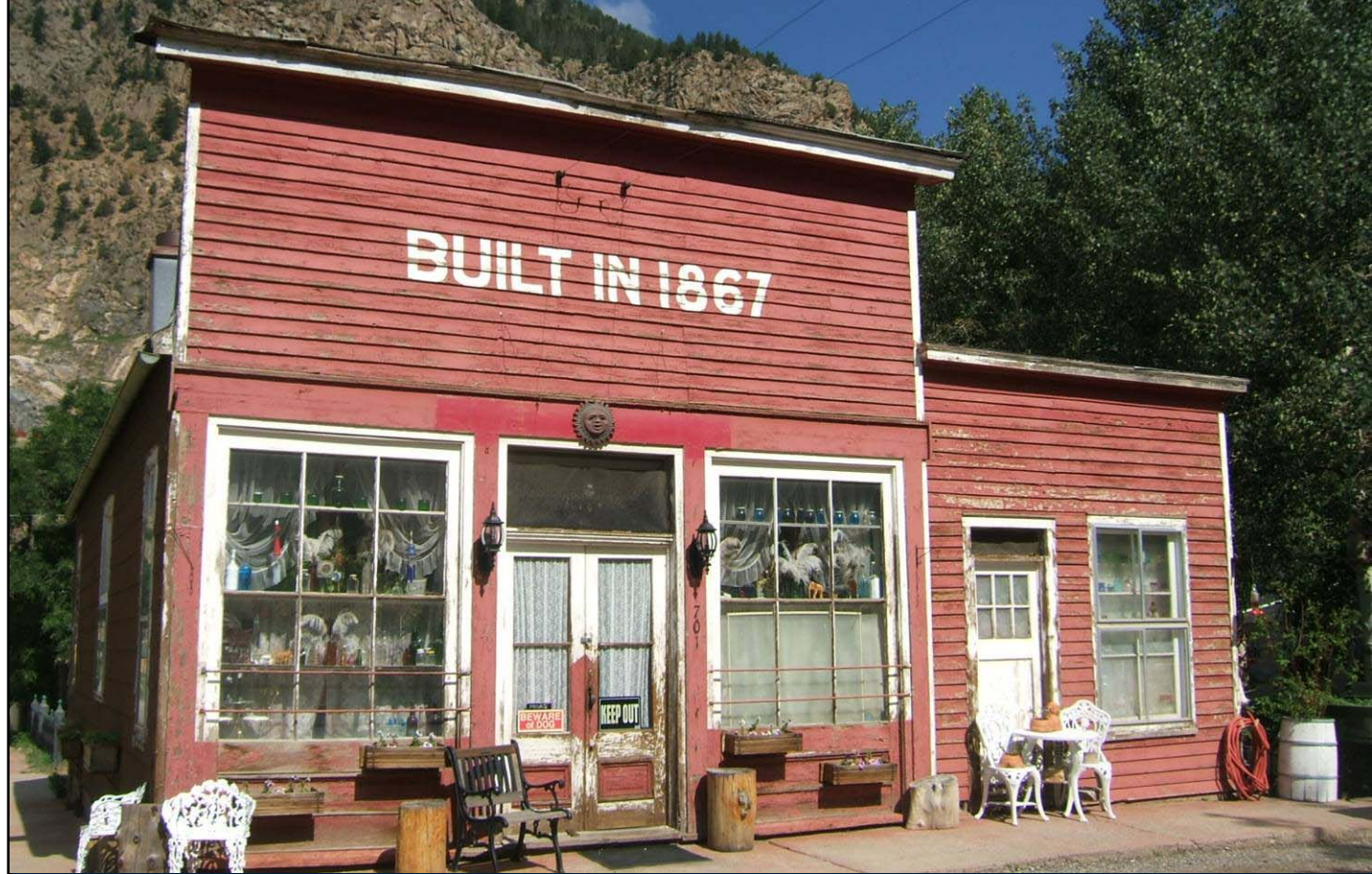
Intersection of Preservation & Environmental Sustainability



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

RESEARCH ITEM 1

Understanding the real impact of windows to energy efficiency.



WINDOWS THE INFAMOUS DEBATE

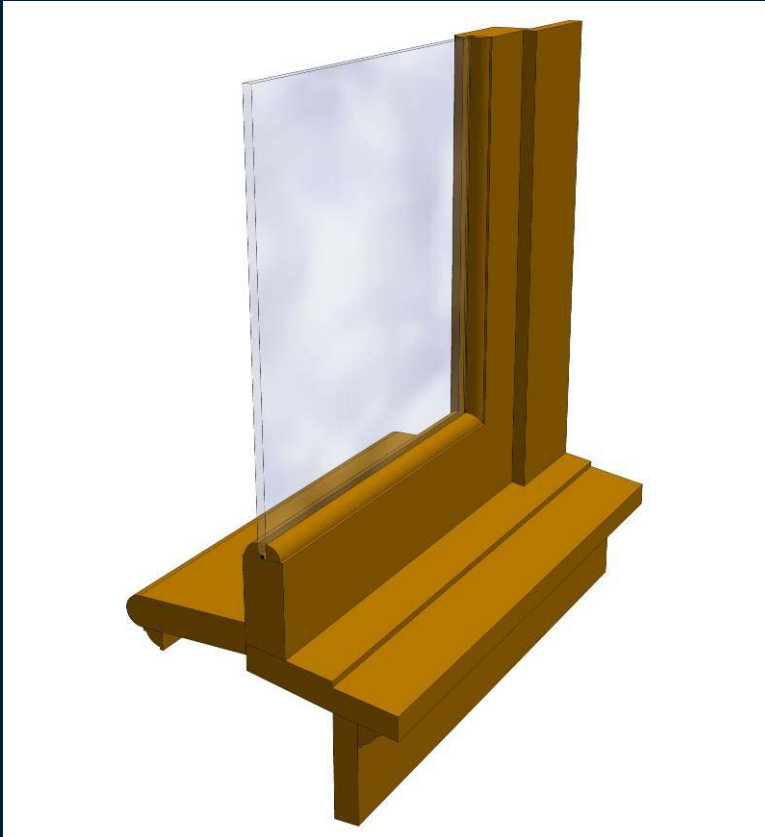
NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®



WINDOWS

Retaining historic windows is often more environmentally friendly than replacement with new thermally resistant windows.

Renewal – Windows



Traditional Wood Window



Modern Aluminum Window

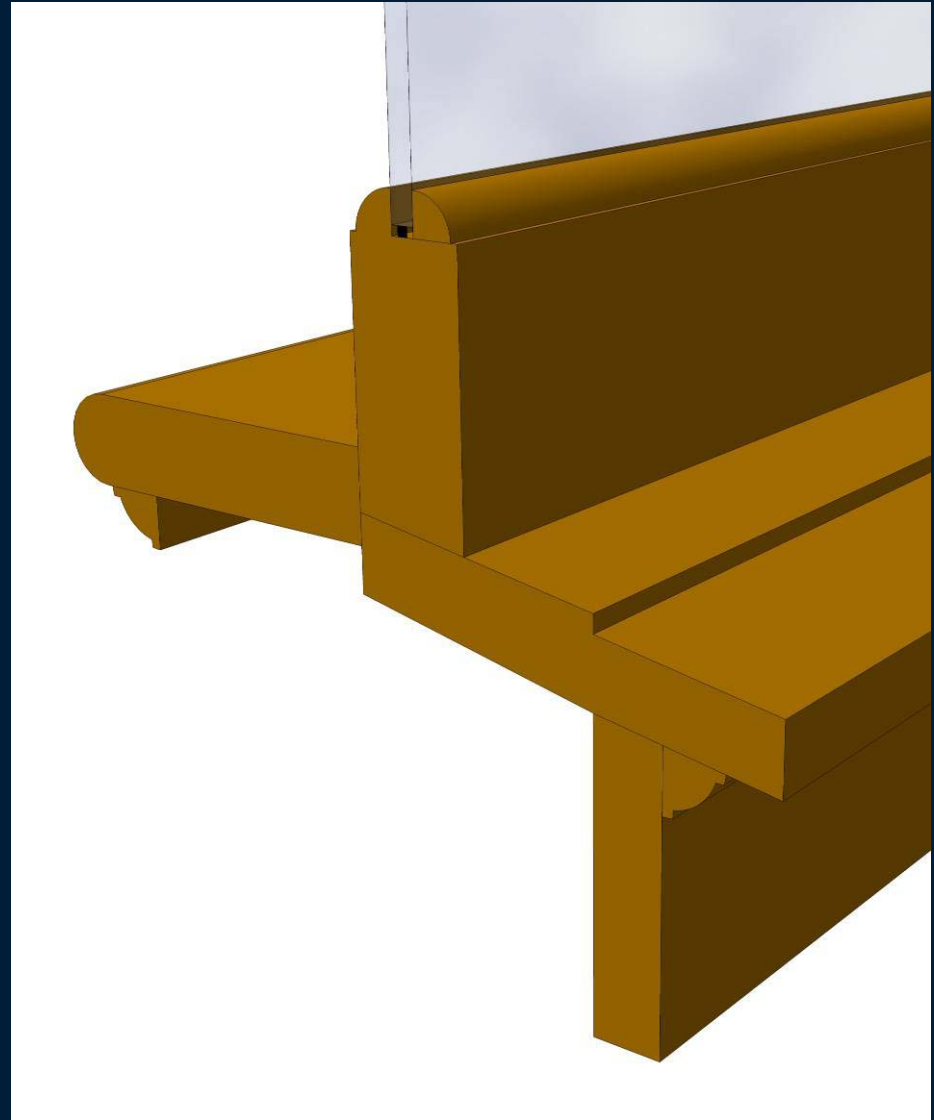
Renewal

Traditional Wood Windows

Single-pane glazing
Replacement
Recyclable

Glazing compound
Repair

Field painted wood
sash & frame
Repair
Renew



Renewal

Modern Aluminum Windows

Double-pane glazing
with desiccant-filled metal spacer
and edge sealant

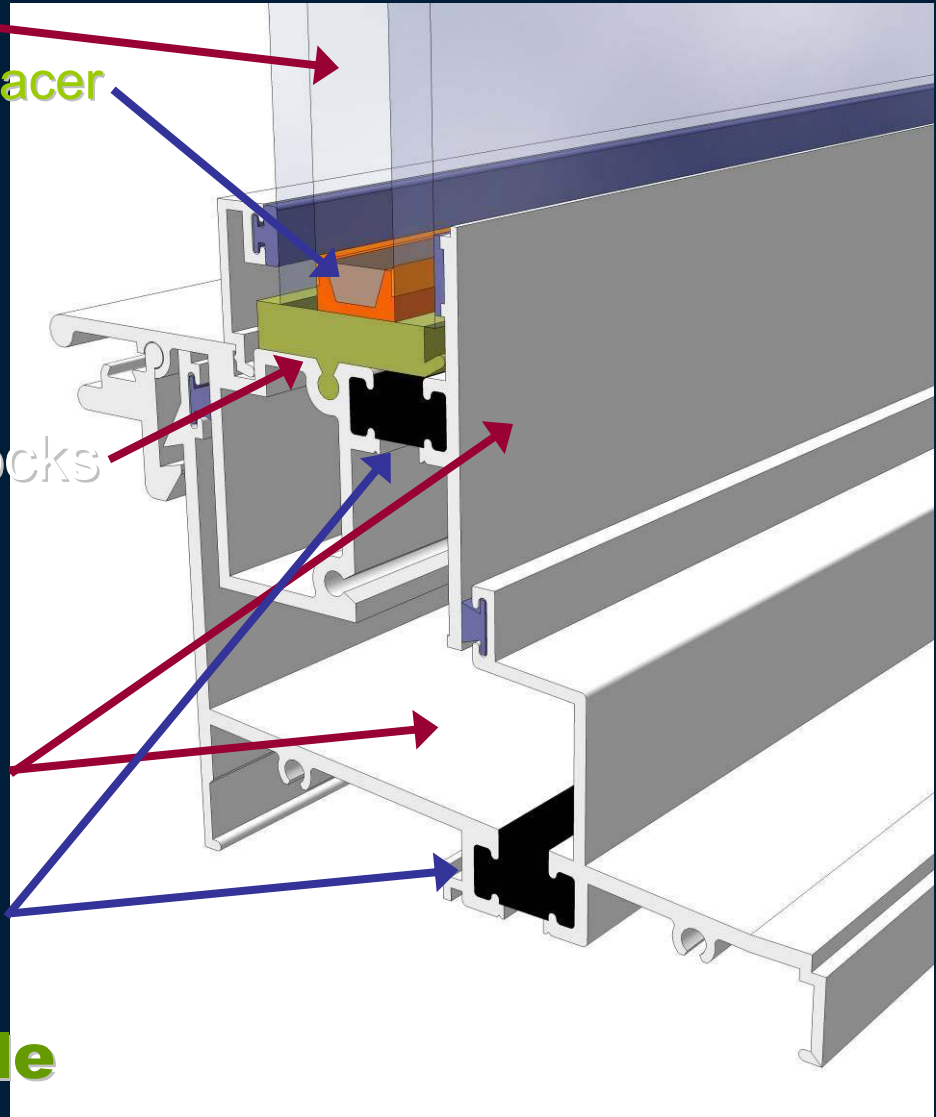
Replacement
Not Recyclable

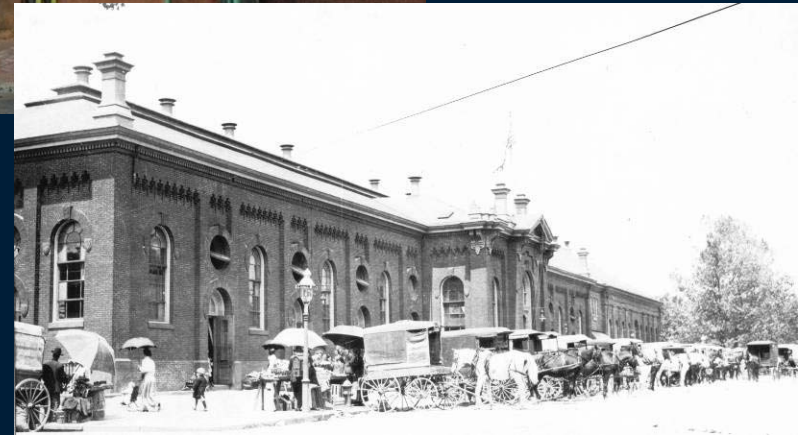
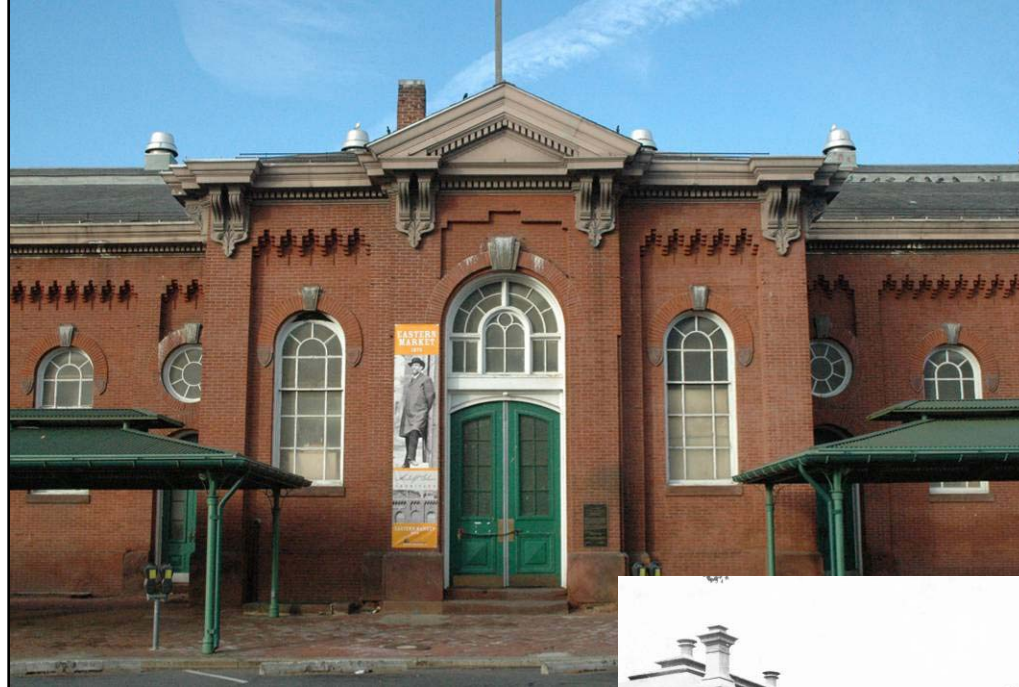
Glazing gaskets and blocks

Replacement
Not Recyclable

Shop painted aluminum
sash & frame
with thermal isolation gasket

Replacement
Mostly Recyclable

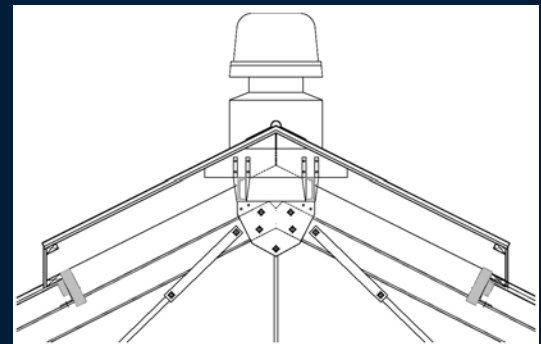
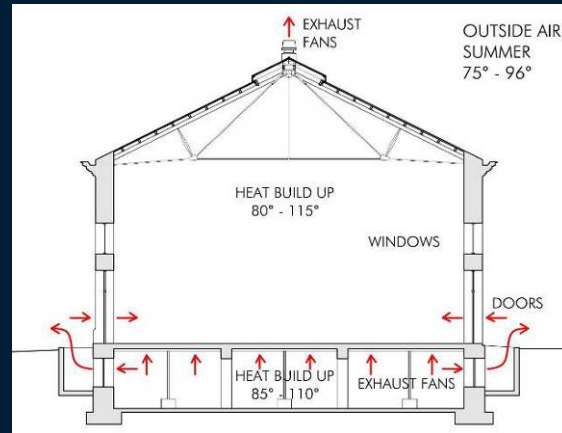




NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

EASTERN MARKET ENERGY MODELING CASE STUDY

Quinn Evans I Architects





TRADITIONAL WINDOWS VS. CURTAIN WALLS

ALL BETS ARE OFF WITH MID-CENTURY
MODERN BUILDINGS



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

RESEARCH ITEM 2

Developing a more useful
Embodied Effects Calculator.

embodied energy: research needs

- More research will be needed to define a benchmark for total building embodied energy values for historic building.
- The original value of the embodied energy is not being calculated.
- The avoided impact of new construction is the primary “embodied energy calculation”.



RESEARCH ITEM 3

Developing an easier Life Cycle Analysis Calculator.

Life cycle analysis: research needs

- The use of embodied energy only does not include any other programmatic variables.
- **General point:** We need to focus on **embodied effects** rather than just embodied energy. These embodied effects are best captured in a life cycle analysis, and include pollution outputs, resource use, waste calculations, energy use and other factors.
- Develop an easy Life Cycle Analysis Calculator.



Museum of Glass, Tacoma, WA

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

WE CAN'T BUILD OUR WAY
OUT OF CLIMATE CHANGE

THE SUSTAINABILITY INITIATIVE



Governor's Palace, Williamsburg, VA

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

WE ALSO CAN'T FREEZE OUR
WAY OUT OF IT....

THE SUSTAINABILITY INITIATIVE



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

IT'S ALL ABOUT CHOICE AND
BALANCE



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

View of Earth from Apollo 17, 1972



**Polar Bears stranded in Northern Alaska, from the *Daily Mail*
February 1, 2007, © EnviroZine**

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®



WE ALL HAVE TO WORK
TOGETHER TO IMPACT THE
POLITICAL WILL
THE SUSTAINABILITY INITIATIVE

The Green Issue

<http://www.preservationnation.org/magazine/2008/january-february/table-of-contents.html>



THE SUSTAINABILITY INITIATIVE

<http://www.preservationnation.org/issues/sustainability/>

NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

www.PRESERVATIONNATION.org

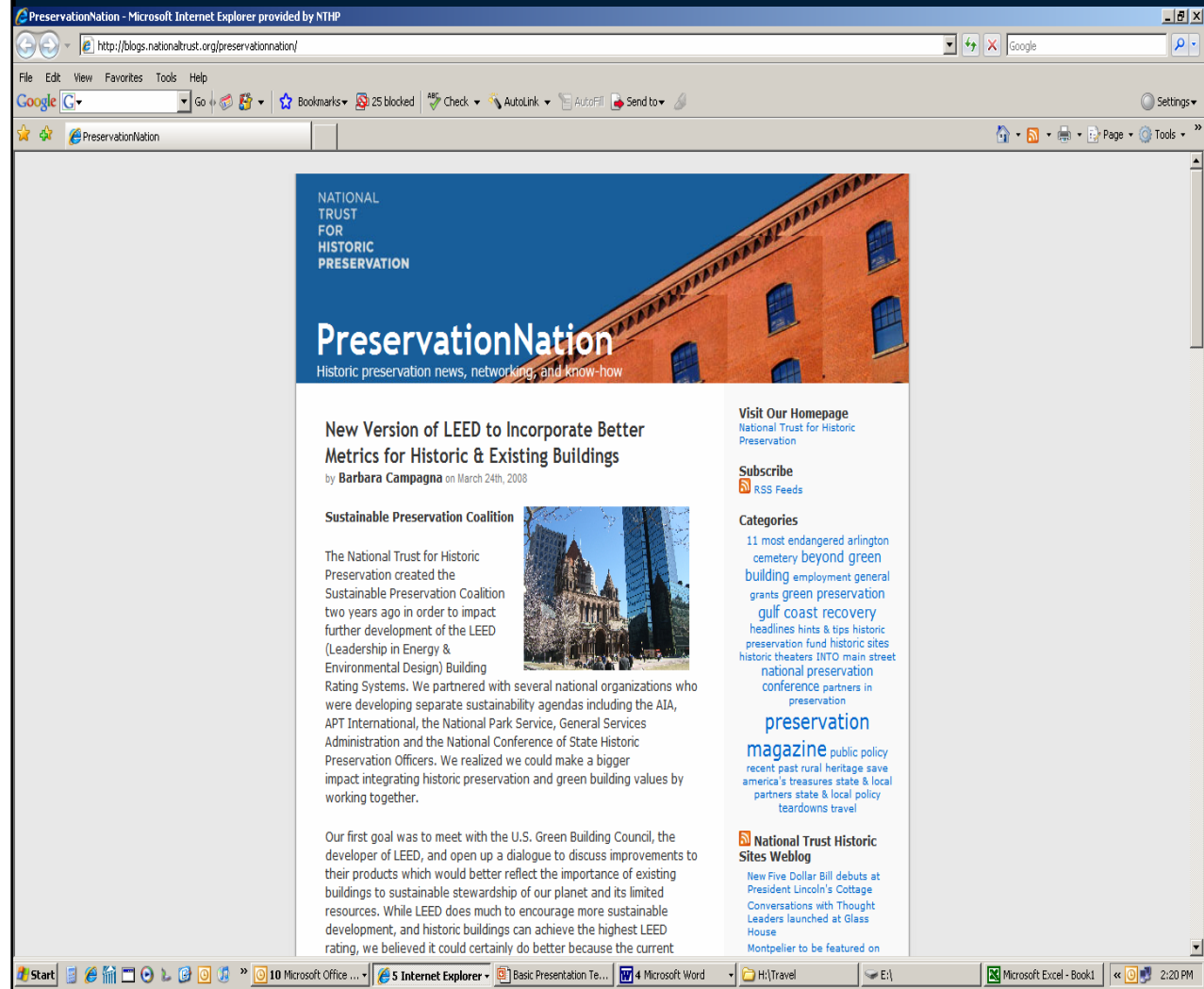


NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

SPREAD THE WORD

beyond green building blog

<http://blogs.nationaltrust.org/preservationnation/?cat=19>



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®



NATIONAL
TRUST
FOR
HISTORIC
PRESERVATION®

THANK YOU,
TO MY NORTHWEST
COLLEAGUES &
FRIENDS!!